

CHECK LIST AND DRAWINGS (ATTACHED)
 MINIMUM BLOWOUT PREVENTER EQUIPMENT REQUIREMENTS
 (ATTACHMENT : : TO BID SHEET AND WELL SPECIFICATIONS)
3000 PSI WORKING PRESSURE
 TO BE INSTALLED AFTER SETTING 13 3/8 INCH CASING

EXHIBIT F
 Page 1 of 3

Contractor or Pzl. to furnish items checked (X). See attached drawing.

No.	Item	Min. Size *	Type	Press. Rating	Furnished By	
					Contr.	Pzl.
1.	Flow Line	8"	Weld	125	X	
2.	Fill Up Line	2"	Thd or Weld	125	X	
3.	Bell Nipple	12"	Weld	125	X	
4.	Rotating Head					
5.	Hydraulically Operated Gate Valve					
6.	Bleed Line					
7.	Bag Preventer	12"	Flanged	3000	X	
8.	Hydraulically Operated Ram Preventer					
9.	Drilling Spool with <u>2</u> in. and <u>2</u> in. Side Outlets	12"	Flanged	3000	X	
10.	Preventer Side Outlets, <u>2</u> in. and <u>2</u> in. Use as alternate to No. 9 above.					
11.	Gate Valve	2"	Flanged	3000	X	
12.	Hydraulically Operated Gate Valve					
13.	Line to Choke Manifold	2"	Flanged	3000	X	
14.	Gate Valve	2"	Flanged	3000	X	
15.	Hydraulically Operated Gate Valve					
16.	Check Valve					
17.	Drilling Spool with <u>2</u> in. and <u>2</u> in. side outlets					
18.	Preventer Side Outlets <u>2</u> in. and <u>2</u> in. Use as alternate to No. 17 above.					
19.	Gate Valve					
20.	Hydraulically Operated Gate Valve					
21.	Relief Line					
22.	Wear Flange or Bushing FOR 12 3/4" CSG.	12"	Threaded	3000	X	
23.	Kill Line to accessible location approx. <u>50</u> ft. from rig.					
24.	Gate Valve					
25.	Kill Line to rig pump manifold	2"	Flanged	3000	X	
26.	<u>4</u> Way Cross, <u>2</u> in. x <u>2</u> in. x <u>2</u> in. x <u>2</u> in.					
27.	Tee, <u>2</u> in. x <u>2</u> in. x <u>2</u> in.					
28.	Half Union					
29.	Casing Spool					
30.	Gate Valve					
31.	Casing Spool					
32.	Gate Valve					
33.	Pressure Gauge					
34.	Casing Head					
35.	Gate Valve					
36.	Gate Valve					

* Line sizes to be inside diameter.

Valves, spools and preventer sizes to be bore dimension.

AUXILIARY EQUIPMENT TO BE FURNISHED BY CONTRACTOR ORPZLAS CHECKED (X)

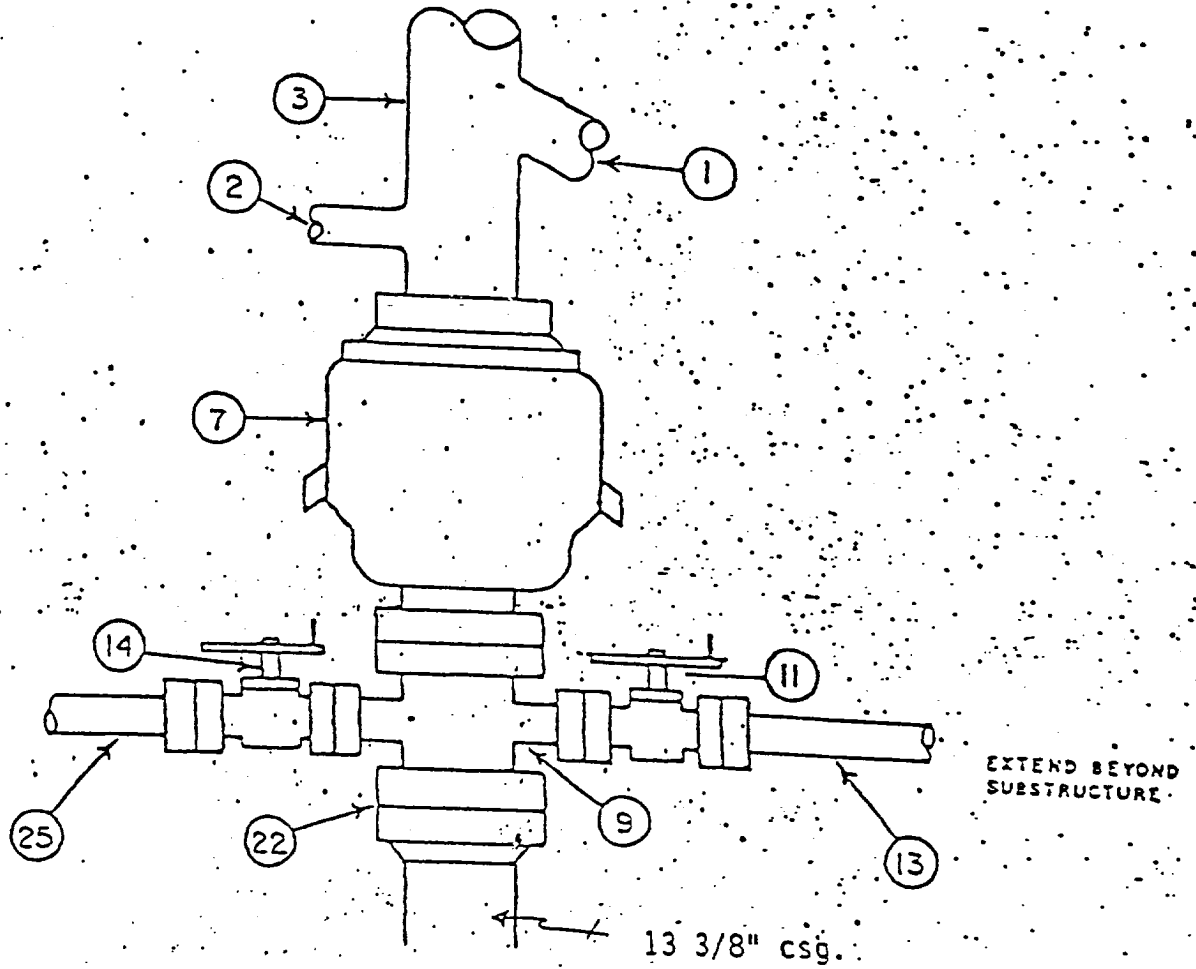
ITEM	Furnished By	
	Contr.	PSL
Automatic Accumulator and Master Control. See below for details.	X	
Remote set of closing unit controls with 2 stations	X	
Bag Preventer Pressure Regulating Control Valve on remote station	X	
Kelly Cocks: Upper - Make _____ Press. Rating 5000 FULL OPENING Lower - Make _____ Press. Rating 5000	X	
Inside Blowout Preventer: Gray/Shaffer _____ PSI WP Drop-In (Hydril) _____ PSI WP		
Full Opening Ball Valve for each size drill pipe in use (Extra Lower Kelly Valves) 5000 PSI WP FULL OPENING	X	
Circulating Head for each type and size of tool joint in use	X	
Ft. of 2 in. steel hose (Chickson) _____ PSI WP		
Blind/Shear Rammer		

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ACCUMULATOR AND MASTER CONTROL
SPECIFICATIONS
REQUIREMENTS CHECKED (X) SHALL APPLY

X	ITEM
X	Accumulator Volume 80 gal., 3000 PSI WP Unit
X	Power for Pumps: Air _____ X Air and Electric \$ _____
X	Pumps Capacity SUFFICIENT CAPACITY TO RECHARGE COMPLETE UNIT IN 6 MINUTES. Gal/Min at PSI
X	Number of Control Valves Required 3
X	Pressure Regulator Valve to control pressure on bag preventer
X	Control Valves on both Master and Remote Control properly labeled with name of respective function and open and closed clearly marked.
X	Blind Ram control on both Master and Remote Control protected to avoid accidental activation. These control handles are not to be locked in position, however, as this could prevent activation from the remote station.
X	Hydraulic Lines from Accumulator to Hydraulic Device to be 0.9 inch minimum ID and have 5000 psi minimum working pressure.
X	Pressure Gauges showing accumulator pressure, manifold pressure, pressure on bag preventer and air supply pressure on both master and remote control stations.
X	Bottled Nitrogen _____ Bottles _____ ft ³ each at _____ psi manifolded to by-pass accumulator and operate BOP directly.

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CHECK LIST AND DRAWINGS (ATTACHED)
 MINIMUM BLOWOUT PREVENTER EQUIPMENT REQUIREMENTS
 (ATTACHMENT TO BID SHEET AND WELL SPECIFICATIONS)
5000 PSI WORKING PRESSURE
 TO BE INSTALLED AFTER SETTING 8-5/8 INCH CASING

Page 1 of 3

Contractor or PzL to furnish items checked (X). See attached drawing.

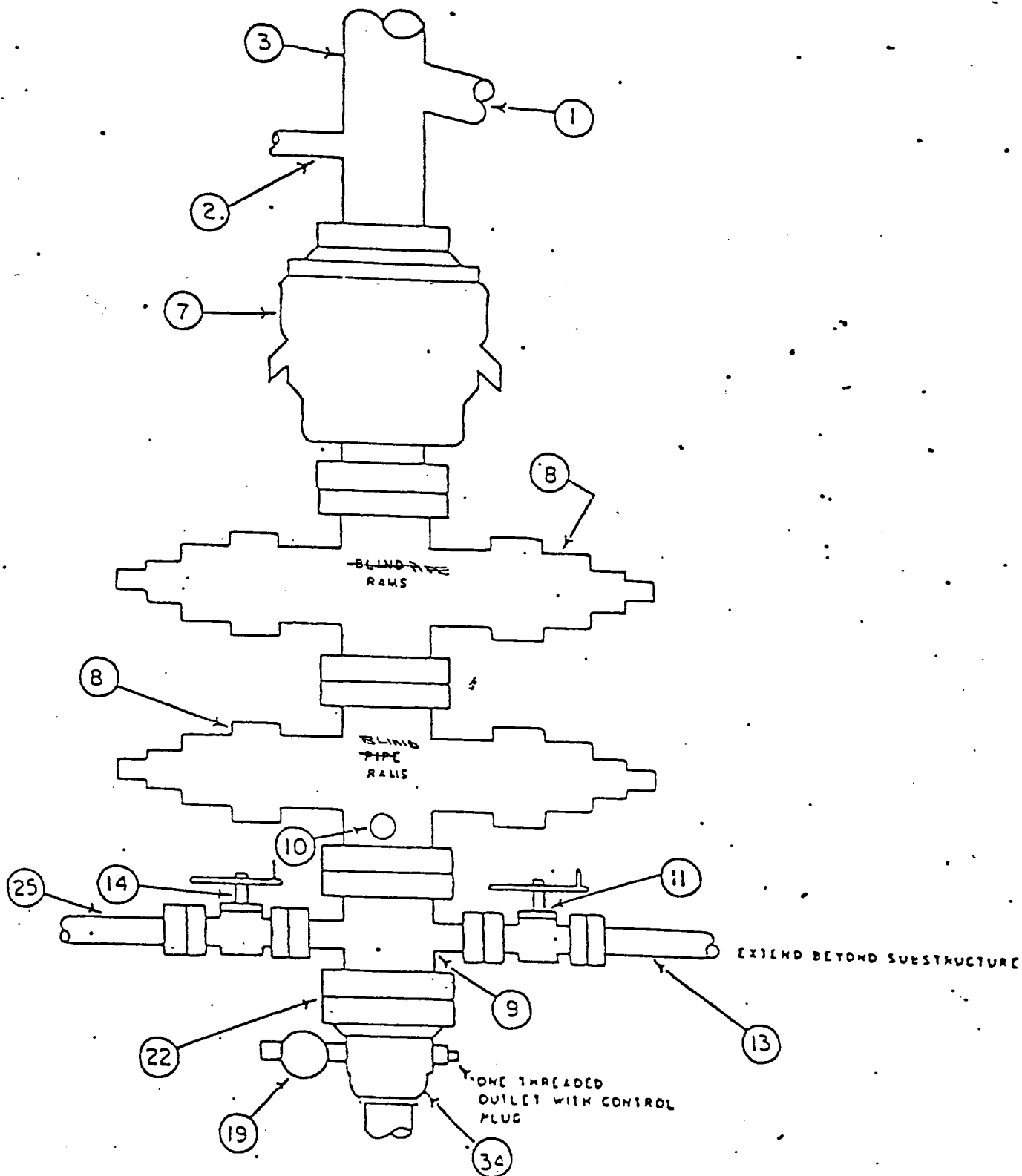
No.	Item	Min. Size *	Type	Press. Rating	Furnished By	
					Contr.	PzL
1.	Flow Line	8"	Weld	125	X	
2.	Fill Up Line	2"	Thd or Weld	125	Y	
3.	Bell Nipple	8"	Weld	125	Y	
4.	Rotating Head					
5.	Hydraulically Operated Gate Valve					
6.	Bleed Line					
7.	Bog Preventer	8"	Flange	5000	Y	
8.	Hydraulically Operated Ram Preventer or Rotating Head					
9.	Drilling Spool with <u>2</u> in. and <u>2</u> in. Side Outlets	8"	Flange	5000	Y	
10.	Preventer Side Outlets, <u>2</u> in. and <u>2</u> in. Use as alternate to No. 9 above.	8"	Flange	5000	X	
11.	Gate Valve	2"	Flange	5000	X	
12.	Hydraulically Operated Gate Valve					
13.	Line to Choke Manifold	2"	Flange	5000	Y	
14.	Gate Valve	2"	Flange	5000	X	
15.	Hydraulically Operated Gate Valve					
16.	Check Valve					
17.	Drilling Spool with _____ in. and _____ in. side outlets					
18.	Preventer Side Outlets _____ in. and _____ in. Use as alternate to No. 17 above.					
19.	Gate Valve	2"	Flange	5000		X
20.	Hydraulically Operated Gate Valve					
21.	Relief Line					
22.	Wear Flange or Bushing	N/A				
23.	Kill Line to accessible location approx. _____ ft. from rig.					
24.	Gate Valve					
25.	Kill Line to rig pump manifold	2"	Flange	5000	X	
26.	_____ Way Cross, _____ in. x _____ in. x _____ in. x _____ in.					
27.	Tee, _____ in. x _____ in. x _____ in.					
28.	Half Union					
29.	Casing Spool					
30.	Gate Valve					
31.	Casing Spool					
32.	Gate Valve					
33.	Pressure Gauge					
34.	Casing Head	8"	Flange	5000		Y
35.	Gate Valve					
36.	Gate Valve					

* Line sizes to be inside diameter.

Valves, spools and preventer sizes to be bore dimensions.

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- All connections on the BOP stack shall be flanged or bolted ring clamp of comparable rating.
- All flanges to be API 6B or 6BX and ring gaskets shall be API RX or BX.
3. All drilling spools are to be forged steel construction. Spools constructed from pipe are not acceptable.
4. The fill-up line shall not be connected to any side outlet below the uppermost preventer.
5. Replacement parts for the BOP equipment shall be obtained from the original manufacturer.
6. BOP stack shall be properly braced to rig substructure by turnbuckled lines or rods.
7. Connections on the kill line, choke lines and choke manifold:
 - ☒ May be threaded, welded, flanged or bolted ring clamp.
 - ☐ Shall be either flanged or bolted ring clamp of comparable rating.
8. All gate valves must be equipped with hand wheels.
9. Choke and kill lines are to be seamless steel pipe having a minimum working pressure that is based on 80% of the API minimum internal yield pressure rating of that pipe.
10. The kill line shall not be used as a fill-up line.
11. All choke lines must be as straight as possible with no abrupt bends or turns.
12. All choke lines are to be securely anchored.
13. Steel hose (chicksons) are not to be used in any part of the choke manifold.
14. The accumulator unit and master set of controls shall be located at ground level, a minimum of 75 ft. from the well bore. The remote set of controls is to be located near the driller's position on the rig floor.
15. All hydraulic lines between the accumulator and any hydraulically operated device shall be of seamless steel pipe and swing joints. Rubber hoses are not permitted. Short lengths of high pressure hose are permitted in lines connecting the remote station to the valve actuating cylinders on the master control unit.
16. Housing and heating should be provided for accumulator, blowout preventers and choke manifold where conditions warrant.
17. All drill string blowout prevention equipment must be maintained in good operating condition and stored in an orderly condition on the rig floor.
- Operating wrenches for the drill string BOP equipment are to be kept in full view near the driller's position.
19. Contractor to make no connection to casing head side outlets except by orders of Pzl.
20. Keep on rig:
 - (a) One spare set of pipe rams, complete with packing rubbers for each size of drill pipe in use.
 - (b) Replacement parts for all manual adjustable chokes along with the necessary tools for changing parts.
21. When a rotating head is in use on the BOP stack, dresser sleeve connections in the flowline are not permitted.
22. Hand wheels and extensions (outside the substructure) shall be installed for operating the locking screws on all ram preventers and hydraulically operated gate valves on the choke and kill lines. If the installation of these extensions create a safety hazard or for some unavoidable reason cannot be properly installed, a hand crank or wrench should be readily available to operate the locking screws.
23. When a wear bushing is required, only the lock-in type shall be used.
24. Water lines and valves shall be connected and ready for use on all internal combustion engine exhausts.
25. The cellar is to be kept jettied and the preventer stack and choke manifold washed down at all times.
26. All valves are to be lubricated at regular intervals.
27. All valves are to be clearly identified as being open or closed.
28. Proper alignment of the rig with the center line of the BOP stack and casing shall be maintained at all times.
29. All flange bolts on the stack, kill line and choke manifold should be tightened at least once each week.

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**CHECKLIST AND DRAWING
MINIMUM CHOKE MANIFOLD EQUIPMENT REQUIREMENTS
(ATTACHMENT TO BID SHEET AND WELL SPECIFICATIONS)**

5000 PSI WORKING PRESSURE

TO BE INSTALLED AFTER SETTING 8-5/8 INCH CASING

Contractor or PzL to furnish items checked (X). See attached drawing.

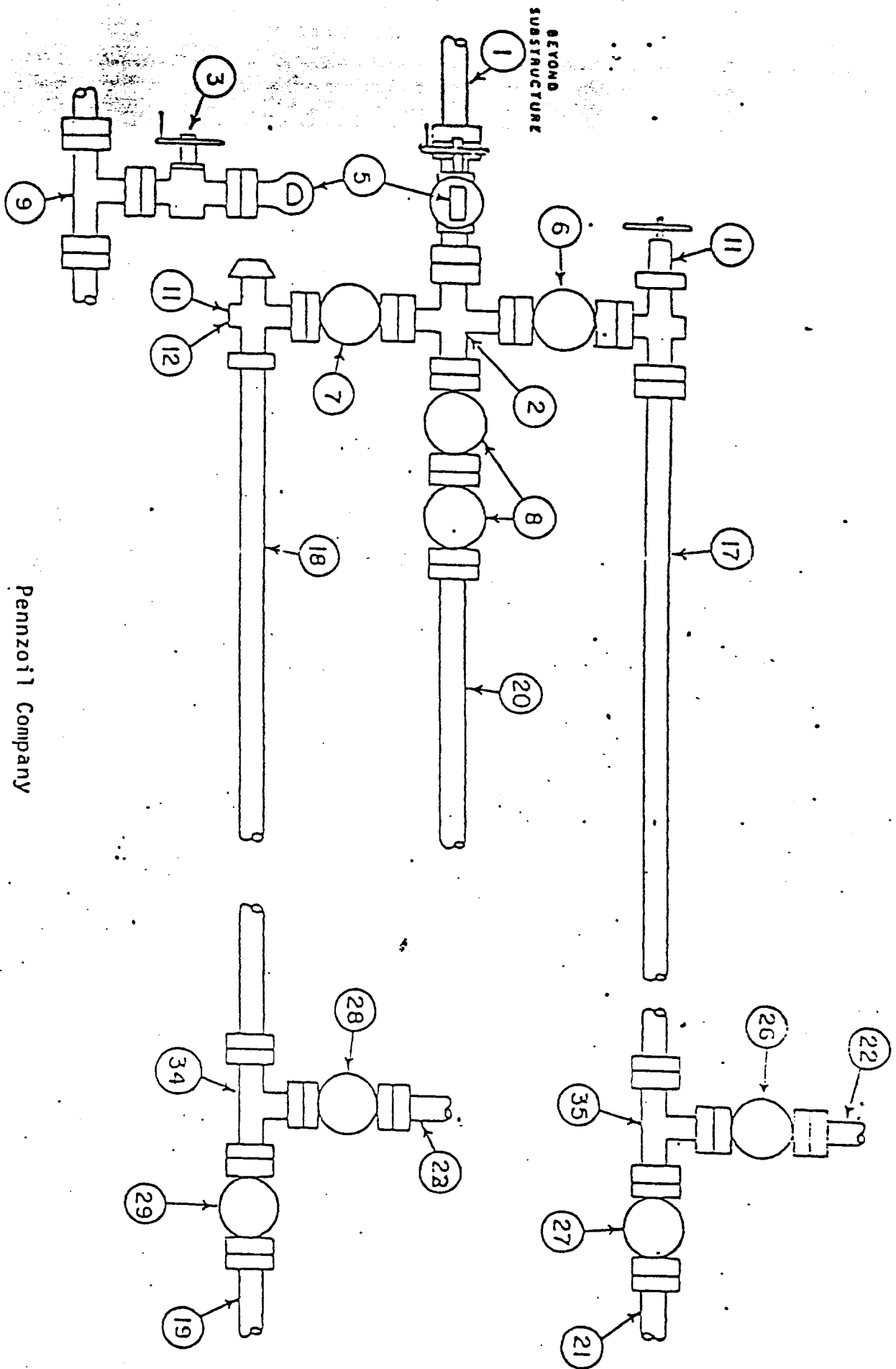
No.	Item	Min. Size	Type	Press. Rating	Furnished By	
					Contr.	PzL
1	Choke Line from BOP stack (same as Item No. 13 on Attachment 2)	2	Weld or Flg	5000	X	
2	Way Cross, 2 in. x 2 in. x 2 in. x 2 in.	2	Flg	5000	X	
3	Gate Valve	1 13/16"	Flg	5000	X	
4	Pressure Sensor				X	
5	Pressure Gauge	1	Thd	5000	X	
6	Gate Valve	2	Flg	5000	X	
7	Gate Valve	2	Flg	5000	X	
8	Gate Valve	2	Flg	5000	X	
9	Way Cross, in. x in. x in. x in.				X	
10	Way Cross, in. x in. x in. x in.					
11	Adjustable Choke	2	Flg	5000	X	
12	Positive Choke	2	Flg	5000	X	
13	Hydraulically Operated Choke				X	
14	Forged Extension Spool					
15	Hydraulically Operated Gate Valve					
16	Hydraulically Operated Gate Valve					
17	Line to Low Pressure Header	2	Welded	1000	X	
18	Line to Low Pressure Header	2	"	1000	X	
19	Line to Burn Pit	2	Weld on Thd	1000	X	
20	Line to Burn Pit	2	Welded	1000	X	
21	Line to Reserve Pit	2	Weld on Thd	1000	X	
22	Line to Mud Pit	2	Weld on Thd	1000	X	
23	Line to Mud/Gas Separator	2	Weld on Thd	1000	X	
24	Header				X	
25	Header					
26	Gate Valve	2	Flg	1000		Y
27	Gate Valve	2	Flg	1000		Y
28	Gate Valve	2	Flg	1000		Y
29	Gate Valve	2	Flg	1000		Y
30	Gate Valve					Y
31	Gate Valve					
32	Base for Choke Manifold					
33	Block Tee, in. x in. x in. x					
34	Tee 2 in. x 2 in. x 2 in.	2	Flg	1000		Y
35	Tee 2 in. x 2 in. x 2 in.	2	Flg	1000		Y
36	Operating Consoles for Hydraulic Choke					
37	Line to Low Pressure Header					
38	Line to Reserve Pit					
39	Line to Mud/Gas Separator					
40	Line to Mud/Gas Separator					
41	Line to Burn Pit					
42	Forged Extension Spool					
43	Way Cross, in. x in. x in. x in.					
44	Gate Valve					
45	Gate Valve					
46	Gate Valve					

* Line sizes to be inside diameter.

Valves, spools and preventer sizes to be bore dimension.

Header size to be outside diameter.

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INSTRUCTIONS FOR CONTRACTORS
(ATTACHMENT TO BID SHEET AND WELL SPECIFICATIONS)
TESTING AND OPERATION OF BLOWOUT PREVENTION EQUIPMENT

Minimum blowout preventer requirements have been established by Pz1. The applicable BOP and Manifold drawing shall be furnished the contractor and will be included as part of the specifications and requirements of the Bid Sheet and Well Specifications.

The appropriate blowout preventer equipment shall be installed immediately after conductor, surface, intermediate, or production casing is cemented; at which time the entire BOP stack with manifold is to be completely assembled, installed, pressure tested, performance tested, ready for immediate use, prior to drilling out.

TESTING BLOWOUT PREVENTERS AND CASING

Routine blowout preventer pressure tests, performance tests, and casing tests will be made following installation of the equipment and prior to drilling out. Pz1 may specify additional tests prior to penetrating a known abnormally pressured zone; or any other time considered necessary. Details of inspection, test pressures, and test periods will be furnished by Pz1's foreman.

Careful alignment of rig must be maintained to prevent excessive wellhead and casing wear.

Preventers must be actuated with sufficient frequency to insure all equipment is in proper working condition at all times.

Operation and testing of preventer equipment and casing must be recorded on the daily drilling tour sheets, unless Pz1 provides special forms for this purpose.

TRAINING RIG CREWS FOR OPERATION OF BLOWOUT EQUIPMENT

It is the Contractor's responsibility to assure that each crew is well trained, familiar with installation, maintenance and operation of all blowout prevention equipment. It is also the Contractor's responsibility to see that adequate drills are conducted to assure that all crews are competent and capable of handling any potential blowout.

If Contractor has a standard drill procedure, this should be used. Otherwise, Contractor's and Pz1's foreman should agree on procedure to be followed.

INDICATION OF EMERGENCY

There are numerous signs which may indicate an approaching emergency. If these signs are detected in time and recognized as a warning, there is no valid reason for a well getting out of control. All crew members must always be alert and trained to recognize these signs.

Listed below are a number of indications which may be forerunners of trouble, and must be checked out when they occur:

1. Fluid rise in pits, (which indicates well is unloading), hydrostatic mud weight may be too light; formation fluid or gas entering bore hole; accumulation of air from past trip being circulated to surface; or lost circulation zone flowing mud back into bore hole during trip.
2. Increase in pump speed or decrease in pump pressure while drilling, (may be caused by formation fluid or gas entering the bore hole and lightening the mud column; mud pump not functioning properly; or washed out drill pipe or drill collars).
3. A drilling break in a known or suspected productive interval.
4. Mud continuing to flow from bore hole after pumps are stopped, (1) may be caused by formation fluid or gas entering bore hole; (2) from an unbalanced mud column (heavy mud having been pumped into drill pipe and lighter mud in the annulus).
5. Continued flow of mud from drill pipe when tripping, or drill pipe failing to dry up when pulling.
6. Decrease in mud weight because of gas cutting.
7. Hole not taking proper amount of mud when tripping out of the hole, (may be caused by swabbing action of drill string and bit; or an insufficient mud weight over-balance on formation when pump is taken off the hole).
8. Loss of circulation; causing a lowering of fluid in the hole, which decreases hydrostatic pressure and may allow formation fluid or gas to enter the bore hole.
9. Any unusual condition occurring while drilling, circulating or tripping which cannot be quickly identified or explained.

EMERGENCY PROCEDURE

When the driller has decided a blowout threatens from any of the above-mentioned items, he should follow procedures used in blowout prevention drills. In addition, he should contact his supervisor as soon as possible, who in turn should contact Pzl's supervisor.

Contractor's and Pzl's supervisors should agree in advance on procedures to be followed. If agreed upon, Pzl's "Emergency Procedure for Blowout Prevention" and "Kick Control Work Sheet" should be posted at the well.

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